

P-Channel Enhancement Mode Field Effect Transistor

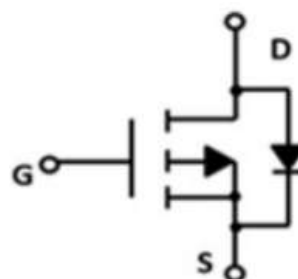
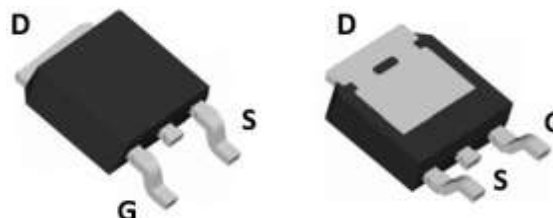
Applications

- PWM Applications
- Load Switch
- Power Management

Product Summary

- V_{DS} -30V
- I_D -60A
- $R_{DS(ON)}$ (at $V_{GS}=-10V$) = 7.5 mohm
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) = 11.5mohm

TO-252



Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^{\circ}C$	-60	A
		$T_C = 100^{\circ}C$	-26	A
I_{DM}	Pulsed Drain Current ^{note1}		-220	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}		121	mJ
P_D	Power Dissipation	$T_C = 25^{\circ}C$	52	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.9	$^{\circ}C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	$^{\circ}C$

**P-Channel Enhancement Mode Field Effect Transistor****Electrical Characteristics** ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} =0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.0	-1.6	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} = -10V, I _D = -30A	-	7.5	10	mΩ
		V _{GS} = -4.5V, I _D = -20A	-	11.5	16	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} =0V, f=1.0MHz	-	3564	-	pF
C _{oss}	Output Capacitance		-	416	-	pF
C _{rss}	Reverse Transfer Capacitance		-	373	-	pF
Q _g	Total Gate Charge	V _{DS} = -15V, I _D = -20A, V _{GS} = -10V	-	37	-	nC
Q _{gs}	Gate-Source Charge		-	6.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	9.4	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -15V, I _D = -30A, V _{GS} = -10V, R _{GEN} =2.5Ω	-	16	-	ns
t _r	Turn-on Rise Time		-	21	-	ns
t _{d(off)}	Turn-off Delay Time		-	68	-	ns
t _f	Turn-off Fall Time		-	52	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _s	Maximum Continuous Drain to Source Diode Forward Current		-	-	-55	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-220	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _s = -30A	-	-0.8	-1.2	V

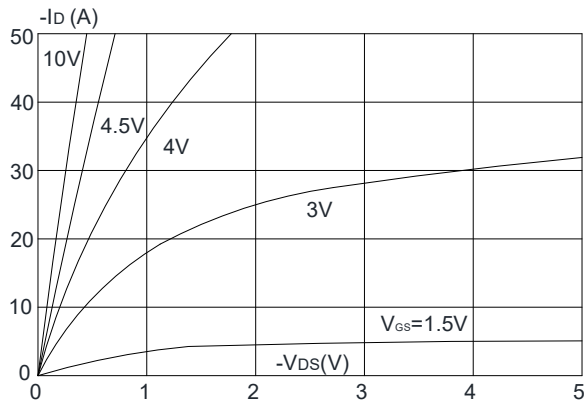
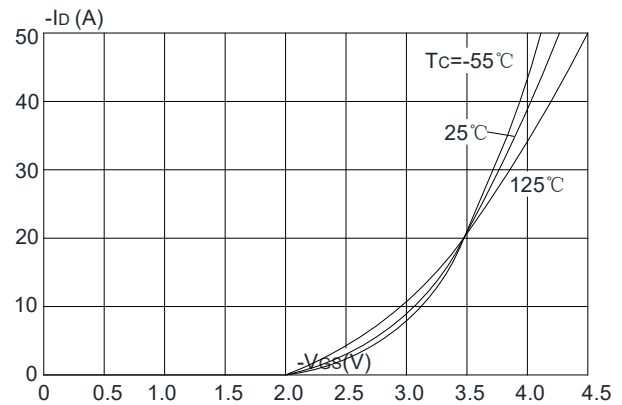
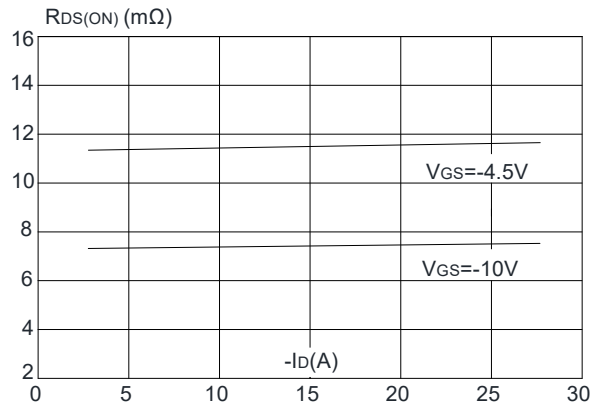
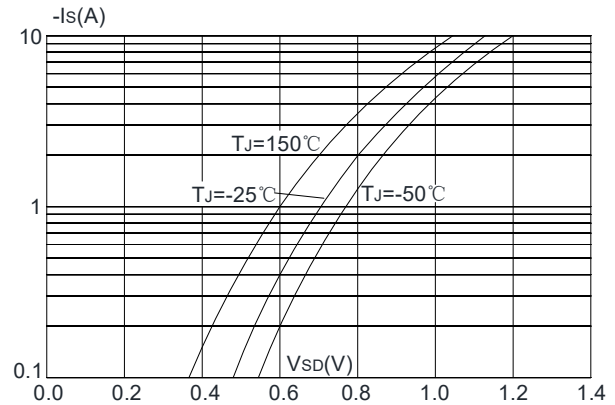
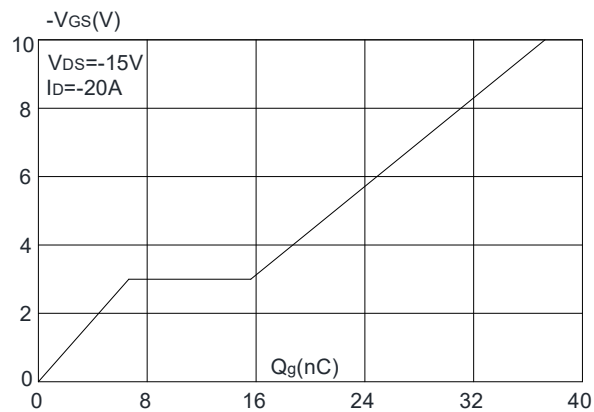
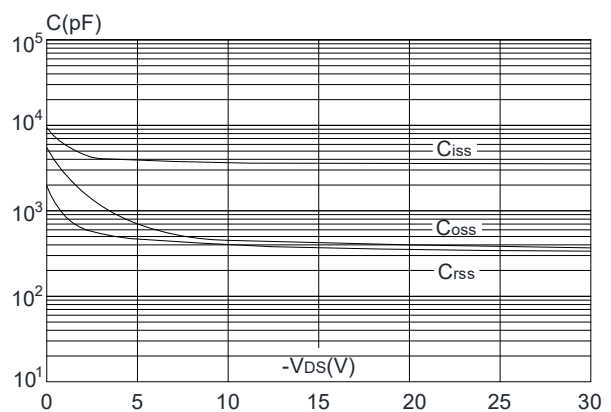
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. E_{AS} condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=-15V$, $V_G=-10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=-22A$ 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



P-Channel Enhancement Mode Field Effect Transistor

Typical Performance Characteristics

Figure1: Output Characteristics**Figure 2: Typical Transfer Characteristics****Figure 3: On-resistance vs. Drain Current****Figure 4: Body Diode Characteristics****Figure 5: Gate Charge Characteristics****Figure 6: Capacitance Characteristics**

P-Channel Enhancement Mode Field Effect Transistor

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

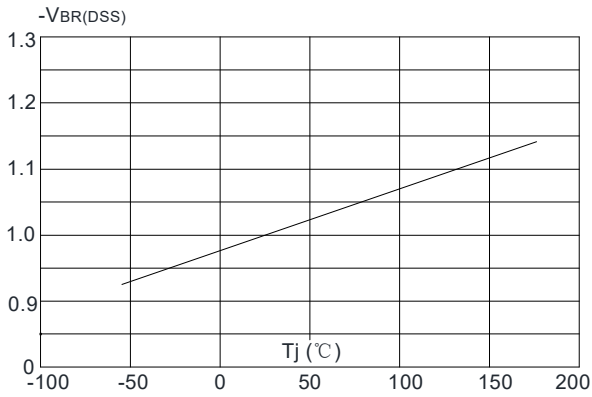


Figure 8: Normalized on Resistance vs. Junction Temperature

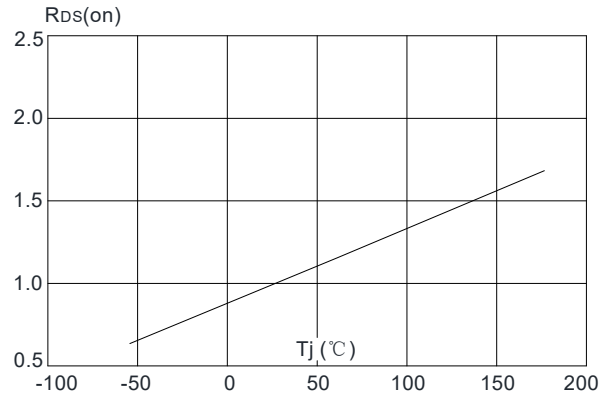


Figure 9: Maximum Safe Operating Area

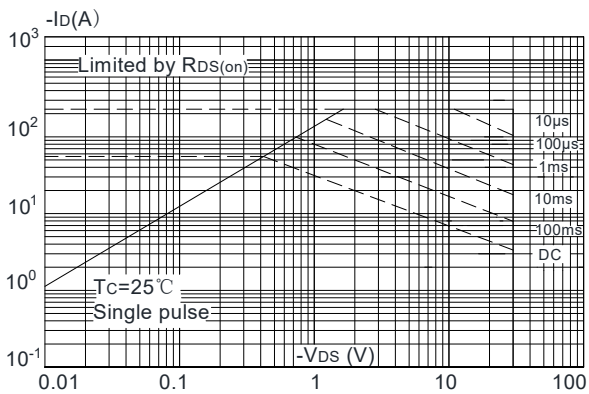
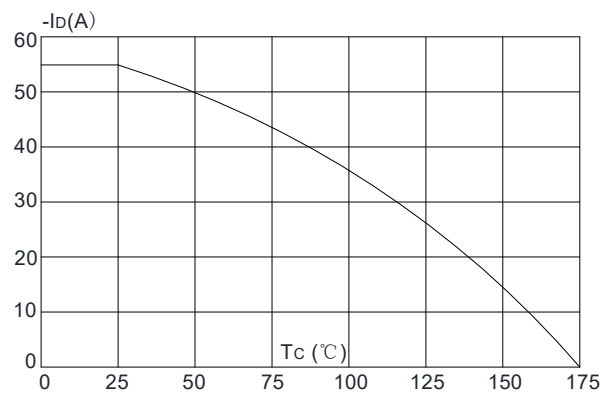
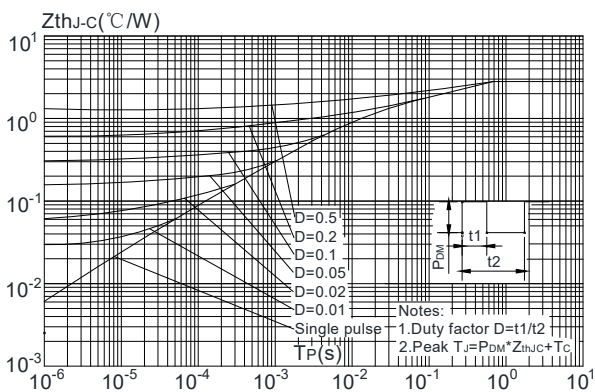


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case

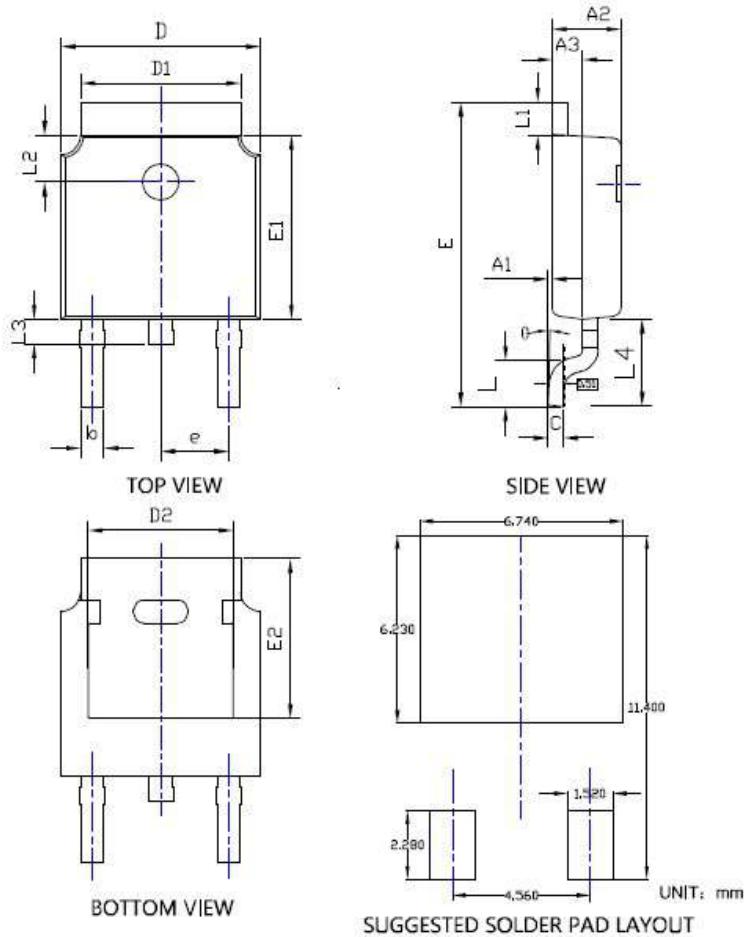




60P03

P-Channel Enhancement Mode Field Effect Transistor

TO-252 Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NDM.	MAX.	MIN.	NDM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
ø	0*	---	10*	0*	---	10*